higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1080**(E)**(N22)T

NOVEMBER EXAMINATION

NATIONAL CERTIFICATE

PLATERS' THEORY N2

(11022182)

22 November 2016 (X-Paper)
09:00–12:00

Nonprogrammable calculators and drawing instruments may be used.

This question paper consists of 5 pages and 2 addenda.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
PLATERS' THEORY N2
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Freehand drawing must be done in pencil and must be neat and reasonably large.
5. Write neatly and legibly.

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QUESTION 1: MACHINES

1.1 FIGURE 1, ADDENDUM A (attached), shows a pedestal drilling machine. Label the components (A–E), as indicated on the drawing, in the ANSWER BOOK. (5)

1.2 State TWO safety precautions to be observed when working with a pedestal grinding machine. (2)

1.3 Briefly explain the function of bending rolls in a machine. (3)
[10]

QUESTION 2: ROLLING AND BENDING

2.1 The heel diameter of a 100 × 100 × 6 mm external angle-iron ring is 1,5 m. Calculate the length in millimetres of angle-iron to form the ring by using the formula given below:

$L = [D + T + (T \div 3)]\ 3{,}142$

Where:

L = Length of the angle-iron
D = Heel diameter of the angle-iron
T = thickness of an angle-iron (5)

2.2 A piece of sheet metal, 1 250 mm in diameter, is buckled in the centre.

Describe how the buckle can be removed without using heat and what tools you would use. (Do NOT use a diagram for your explanation.) (5)
[10]

QUESTION 3: JOINING OF ROLLED-STEEL SECTIONS

3.1 Illustrate, by means of a freehand drawing, the method of joining a channel iron to a rolled-steel joist at 90°. (3)

3.2 FIGURE 2, ADDENDUM A (attached), shows two plates which are not on the same level. Show by means of a sketch how to level the two plates. (4)

3.3 Name THREE advantages of using a well-designed assembly jig in a welding shop. (3)
[10]

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QUESTION 4: GENERAL PIPEWORK

4.1 FIGURE 3, ADDENDUM A (attached), shows a pipe bend. Calculate the angle of cut and the length of segment required to construct the pipe bend. (6)

4.2 Show by means of a freehand drawing *two holes top* when referring to pipe flanges. (2)
[8]

QUESTION 5: STEEL STRUCTURES

FIGURE 4, ADDENDUM B (attached), shows the shoe of a steel-roof truss. Label the components (A–F), as indicated on the drawing, in the ANSWER BOOK. **[6]**

QUESTION 6: TEMPLATES

FIGURE 5, ADDENDUM B (attached), shows two views of an angle-iron cleat. Make a box template to indicate all the information required, for marking-off of the angle-iron cleat. **[6]**

QUESTION 7: METALS

7.1 Name TWO elements which can be used to alloy carbon steel. (2)

7.2 Explain how the following heat treatments can be applied to steel:

7.2.1 Annealing

7.2.2 Tempering

(2 × 3) (6)
[8]

QUESTION 8: GAS WELDING AND CUTTING

8.1 Briefly discuss the following aspects on the quality of a gas-cut surface:

8.1.1 Cutting speed (4)

8.1.2 Nozzle type (3)

8.1.3 Dirty nozzle (1)

8.2 Name FOUR factors that influence the quality of the gas-cut surface. (4)
[12]

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QUESTION 9: ARC WELDING

9.1 Briefly describe the following terms:

9.1.1 Weld face

9.1.2 Run

9.1.3 Backing bar

9.1.4 Parent metal

(4 × 2) (8)

9.2 Name FIVE causes of undercut. (5)

9.3 Sketch a compound welding symbol large enough to show a fillet joint. (2)

[15]

QUESTION 10: CALCULATION AND PLANNING

Calculate the mass of the plate needed to manufacture an open cylinder.

The following data is available:

Inside diameter = 1 600 mm
Height = 2 000 mm
Thickness of plate = 20 mm
1 mm plate = 7,85 kg/m²

NOTE: Circumference of a cylinder = 3,142 × mean diameter of cylinder
Area of a circle = 3,142 × r²

[15]

TOTAL: 100

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ADDENDUM A

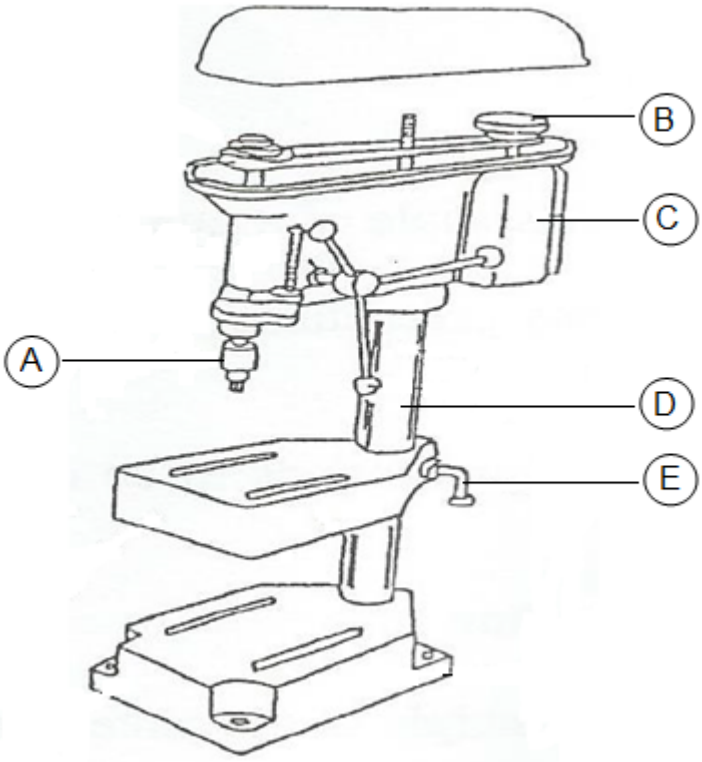

FIGURE 1

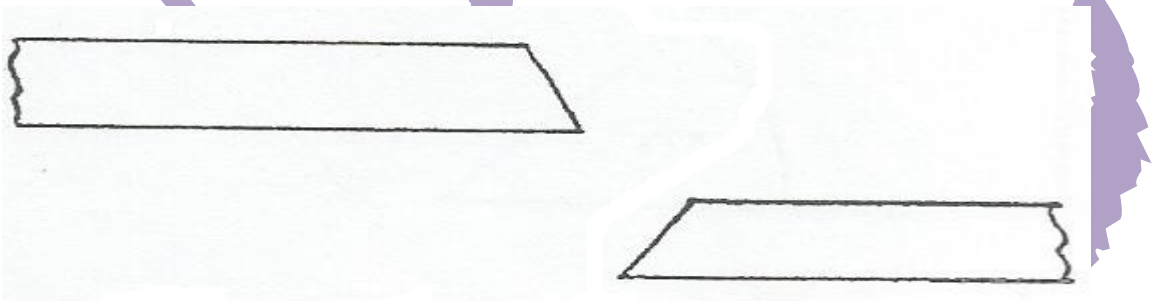

FIGURE 2

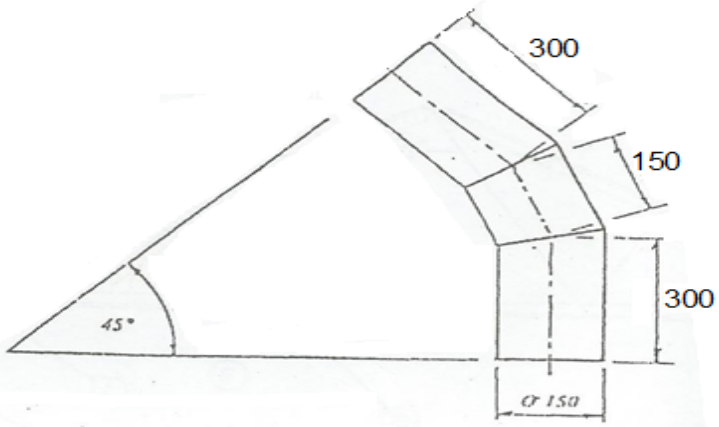

FIGURE 3

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ADDENDUM B

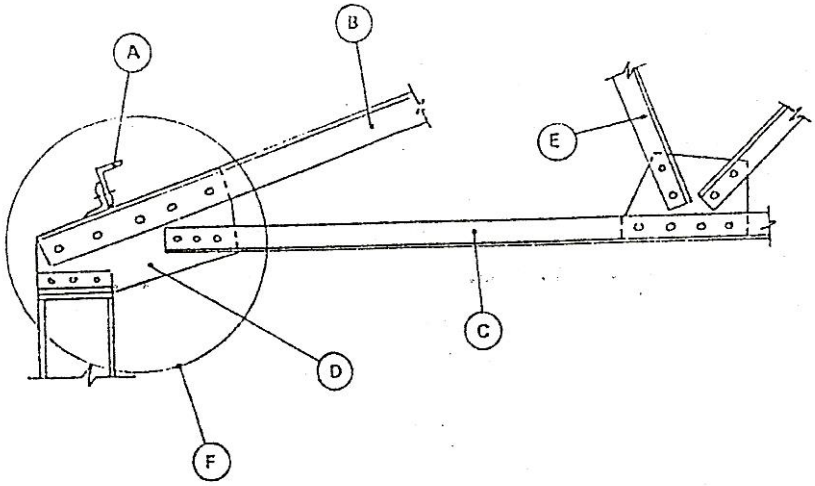

FIGURE 4

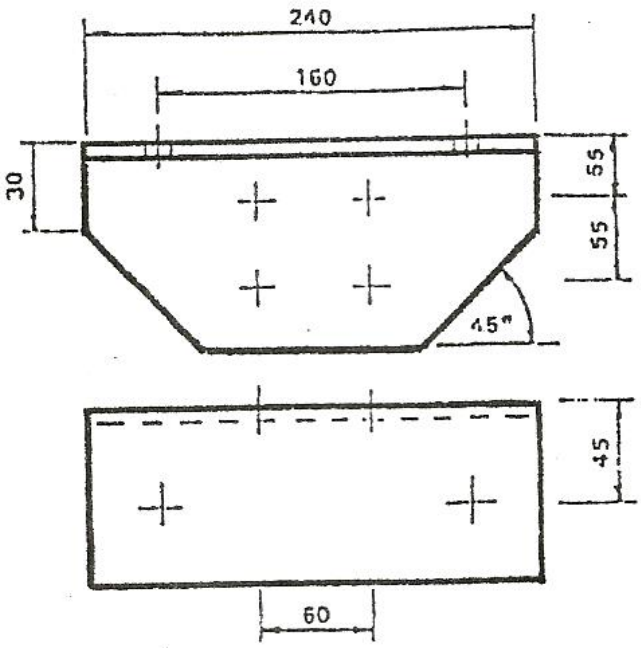

FIGURE 5

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